



**DEPARTMENT OF PHYSICS AND PHYSICAL
OCEANOGRAPHY COLLOQUIUM**

**“Measuring Thickness Variation of Lead Target from Coulomb
Sum Rule Experiment Using Gamma Ray Attenuation.”**

Margaret Schneider

**Physics Major
UNC Wilmington**

The Coulomb Sum Rule experiment at Thomas Jefferson National Accelerator Facility is trying to draw a conclusion about the nuclear effects on the Coulomb potential in nuclei. The objective of this experiment is to determine the electron scattering cross section with high precision in order to more closely relate the properties for nuclei bound nucleons to free nucleons. For the calculations of the cross-section it is important to know the number of protons in the target nuclei, which involves knowing the thickness of the target. The targets used by the Coulomb Sum Rule experiment were composed of lead, carbon, iron, and helium were used to observe possible variations of nuclei properties due to target composition. The purpose of the current experiment was to make thickness calculations using gamma ray attenuation. In gamma ray attenuation a known measured of gamma rays is sent through a material and by measuring the number of gammas making it through the material one can determine the attenuation. The attenuation can be related to the thickness of the material. In this experiment nine locations on the target were tested and found to vary in thickness by $\pm 2.48\%$. These tests were done through 10 minute runs which allowed for a statistical error to be around 0.49% while the reproducibility of was kept below .5%.

**Friday, November 6, 2009
2:00 PM
DeLoach Hall, Room 212**

Refreshments will be served at 1:45 PM

